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ABSTRACT

Since Singapore achieved partial self-government in 1955, economic and political considerations have reshaped educational policy and programs to support the transformation to an industrialized country. Changes in the educational systems include: more facilities for technical education and training; a reorganized secondary school system phasing out vocational schools; an Industrial Training Board (ITB) organized to meet requirements for skilled workers; and a new educational program for students not academically inclined. This Basic Course, consisting of a modified primary curriculum and workshop practice, feeds into a Junior Trainee Scheme of vocational training with many courses provided by the ITB. Course offerings reflect the manpower pyramid with its broad base of semi-skilled labor. The Adult Education Board provides additional courses which prepare students for commercial employment. Male Basic Course students may qualify for the three-year Joint Construction Trades Training Scheme, whereby they enter into a training agreement to learn one of four construction trades. The Joint Government-Industry Training Scheme provides qualifying apprentices with four years of training in precision skills. Those already in the labor force may improve their skills in numerous training programs provided by the Adult Education Board, international firms, factories, and other organizations. (SB)

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COMBINING EDUCATION AND WORK

Experiences in Asia and Oceania

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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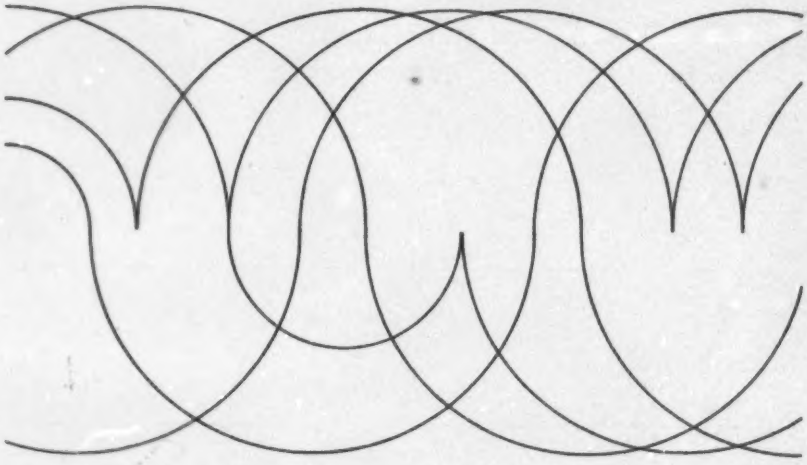

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COMBINING EDUCATION AND WORK

Experiences in Asia and Oceania

Singapore

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PREFACE

Many countries in Asia and Oceania, as in other regions of the world, are engaged in reorienting their education systems. A basic concern underlying these efforts is to make education functional and relevant to the needs of the individual and of the society. It is increasingly felt that the education systems tend to get isolated from the larger social, cultural and development goals of the society. This isolation is engendered when the process of learning is separated from the context of action and work, and is nowhere as marked as in the failure of education to provide children and youth with an active comprehension of the world of work.

The response to the problem is reflected in a variety of programmes underway in several countries of Asia and Oceania. Considering the importance of the issue, the Fourth Regional Conference of Ministers of Education and Those Responsible for Economic Planning in Asia and Oceania (24 July - 1 August 1978, Colombo) has "Interlinking of Education and Productive Work" as one of the major themes of the Conference.

The country studies presented in the present series were received in response to Unesco's request to the Member States. By the time of going to the press, studies from twelve countries were received and they comprise the present series being issued on the occasion of the Fourth Regional Conference. The assistance of Unesco National Commissions in these countries in having the studies prepared and of the organizations and scholars who have been responsible for them is gratefully acknowledged. These studies cover a wide spectrum of experiences, ranging from experimental projects to comprehensive, system-wide programmes, and detailed descriptions are offered of one or more projects in actual operation. It is hoped to add to the series as more country studies become available.

Opinions expressed in this publication are those of the author and do not necessarily represent the views of Unesco.

PART I

A. General Description and Policy Trends

Since partial self-government in 1955, economic and political considerations have been largely responsible for the re-shaping of the education policy in Singapore. The period immediately following partial self-government witnessed the tremendous expansion of educational facilities to meet the demands for school places created by the post-war increase in the school-going population.

Internal self-government was achieved in 1959. In September, 1963 Singapore joined the Federation of Malaysia as a component state with autonomy in education and labour. In August 1965, Singapore separated from Malaysia and became an independent sovereign Republic.

From 1959, educational policies conceived of the process of education as a vehicle for social integration and economic well-being. Nationalism in education had to keep pace with political developments. The principle of parity for the four streams of education - Malay, Chinese, Tamil and English - was promulgated. Universal education was introduced for the first time. All schools in the multi-racial society used a common curriculum. Comprehensive education with a technical bias to meet industrial needs was provided.

For a country without any natural resources, it is an economic imperative to invest in and develop its only asset - human resources. Education for economic survival has never been so intense as when the hitherto entrepot trade economy diversifies with increasingly rapid industrialisation. The transfer of the Republic's economy to an industrial base determines that a large population of the work-force will be industrially employed. Industrial training has thus become a major instrument of economic policy. Rapid industrialization has to be matched with equally rapid changes in education in both course and content to bring about the much needed manpower requirements and human resource development that characterize a growing

industrial community. Education, thus, has a definitive role to play in assisting the transformation of the Republic from what was a largely trading community to one centred on manufacturing and servicing.

Hitherto, the general education system under colonial rule had been associated with the traditional concept that education was the means to "white-collar" jobs to satisfy the demands of trading houses, shipping companies and the civil service. With industrialization in mind, this situation was obviously not in harmony with the new economic policy. Thus the national imperative was to orient education towards preparing the school-going population to "adapt themselves into (sic) the construction work of re-orientating our economic policy and so form the vanguard in laying down the basis for a future socialist society"[1]. It is clear then, in order to develop the economy, the education process has to develop and exploit the potential skill of the people, and the schools are the best place for such a process to begin. Accordingly, a strategy to increase vocational and technical education was adopted in 1960, although prior to this date, technical education in Singapore had a modest beginning in the establishment of a Trade School in 1930 offering pre-apprenticeship courses in various trades for primary school leavers. In 1938, another Trade School was established. Soon after World War II, three craft training centres were added to this list. In 1958, two secondary technical schools were built.

The first significant move to provide more facilities for technical education and training was in 1960 when a "Commission of Inquiry into Vocational and Technical Education in Singapore" was set up. The Commission recommended the establishment of secondary vocational schools to provide two-year courses with a vocational bias for primary school leavers who did not proceed to the academic or technical secondary schools after the Primary School Leaving Examinations. Another main recommendation was the reorganization of a Trade School into a vocational institute to conduct courses of wider variety and greater depth.

In 1968 there were four types of secondary schools in Singapore - academic, multi-purpose, technical and

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1. Yong Nyuk Lin, in *Tasks Ahead - PAP's Five Year Plan, 1959-64*, p. 5.

vocational schools. Academic and multi-purpose schools absorbed more than 81 per cent of the total provision of places in secondary education as shown in Table 1.

Table 1[2]

Accommodation Capacity and Actual Enrolment according to Types of Secondary Schools in 1968

Type	Accommodation Capacity	%	Actual Enrolment	%
1 Academic Schools (Including Multi-Purpose Schools)	135,000	81	129,100	86
2 Technical Schools	15,000	9	11,300	7
3 Vocational Schools	16,000	10	9,900	7
	166,000	100	150,300	100

The academic schools offered a four-year course culminating in the School Certificate Examinations. Besides offering arts and science subjects, a few schools also conducted commercial courses for the third and fourth year pupils. Most of the pupils who did well in their final examinations continued their education in the two-year Pre-University courses held in selected secondary schools. Other School Certificate holders enrolled in technician courses in the Singapore Polytechnic. Those who did not continue their education and training in the Polytechnic or Pre-University classes left school to take up jobs in commerce, industry and government departments. Some enrolled for craft courses.

The multi-purpose schools offered both academic and technical courses similar to those in the academic and technical schools. Girls were to have the option of taking home economics. For the third and fourth years, the plan was to give about 20 per cent of the pupils a technical biased course while the rest were to follow an academic programme.

2. Technical Education Department, *Report for April 1968 - March 1969*, Government Printing Office, 1969, p. 2.

Technical schools also offered a four-year course leading to the School Certificate Examinations. Except for the technical subjects, these schools were almost similar to the academic schools. About 80 per cent of the curriculum time was devoted to general education while Technical Drawing and Workshop Practice took up the remaining 20 per cent. Pupils completing their technical education had the same opportunities as the academic stream counterparts to further their education or look for work.

Vocational schools catered for primary school leavers who failed to be admitted to these three types of secondary schools if they had reached the age of 14. Two-year courses with a practical bias were offered and, on completion, the more suitable students could take up advanced craft training.

In 1968, out of every 100 primary school leavers who transferred to the first year of secondary education, about 73 were in the academic stream, 12 in the technical stream and 15 in the vocational stream. In the case of secondary leavers, for every 100 graduating pupils, 92 were from the academic stream, 2 from the commercial stream and 6 from the technical stream. (See Table 2). A preponderance of school leavers with a purely academic education was not harmonious with the Government's policy of creating jobs through industrialization.

In order to ensure that Singapore's industrialization programme would have the necessary skilled manpower, expansion of the training facilities already available was necessary. To do this quickly, the National Industrial Training Council, comprising the Minister for Education as Chairman, the Minister for Finance, the Minister for Labour and the Parliamentary Secretary for Education, was formed in April, 1968. The Council was responsible for general policies on technical education and industrial training in Singapore. In June of the same year, a separate Technical Education Department in the Ministry of Education, responsible for the administration of Bilateral Schools, Technical Schools, Vocational and Technical Institutes, Industrial Training Centres and the technical department of the Teachers' Training College, came into being.

Secondary education was reorganized. Vocational schools were phased out as they had been unpopular and did not endow the graduates with marketable skills. Some of

Table 2[3]

Enrolment by Level and Type of Secondary Education, July 1968

Level of Education	Type of Education				
	Academic	Commercial	Technical	Vocational	Total
Sec 1	28,413 (73.2)	-	4,626 (11.9)	5,798 (14.9)	38,837 (100)
Sec 2	31,490 (81.4)	239 (0.6)	2,878 (7.5)	4,058 (10.5)	38,665 (100)
Sec 3	29,638 (92.0)	427 (1.3)	2,171 (6.7)	-	32,236 (100)
Sec 4	27,007 (92.4)	631 (2.1)	1,599 (5.5)	-	29,237 (100)
Total	116,548 (83.9)	1,297 (0.9)	11,274 (8.1)	9,856 (7.1)	138,975 (100)

Figures in brackets give the percentages

these vocational schools were converted to vocational centres while others were amalgamated with adjacent academic schools to become bilateral schools. In the new system, all pupils followed a common curriculum during the first two years of secondary education. In addition to the general subjects, all pupils took up Technical Drawing and all boys and 50 per cent of girls underwent Workshop Practice once a week outside the normal school hours. The remainder of the girls studied a Home Economics course. The new lower secondary education not only enabled pupils to acquire literacy, numeracy and the ability to deal with concepts, but also introduced manual skills to them through workshop practice which was provided in Centralized Workshops. Thus, besides a general education, opportunities are also provided for developing practical skills.

Channelling into the different streams of secondary education no longer took place at the end of six years of primary education. The revised procedure required periodic assessments of pupils during the first two years of education and the administration of aptitude tests to provide

3. Technical Education Department, *Report for April 1968 - March 1969*, Government Printing Office, 1969, p. 4.

criteria for channelling, which also ensured that a distributive ratio of approximately three to one between the academic and the technical streams was maintained.

Beyond the school system, graduates of secondary schools and vocational institutes could proceed to various technician courses at the Singapore Polytechnic established in 1954, the Ngee Ann Technical College established in 1963, and the Singapore Technical Institute established in 1969.

In April 1973, the Industrial Training Board (ITB) comprising representatives from industry, labour and government was established. With the formation of ITB, those functions relating to industrial training carried out by the former Technical Education Department, including the institutions and staff concerned, were transferred to the Board. The other functions of the Technical Education Department relating to technical education within the school system, inclusive of the institutions and staff concerned, were re-merged with the General Education Department of the Ministry of Education.

The Industrial Training Board also has responsibilities for promoting apprenticeship training; developing a national system of trade testing; and upgrading of adult skilled workers through programmes of off-the-job industrial training. Thus, the Industrial Training Board is concerned primarily with meeting the requirements of the industrial sector for skilled workers. Both regular institutional programmes for school leavers and specially tailored programmes for industrial workers are available. For school leavers particularly, the Board conducts full-time courses at its vocational institutes up to the National Trade Certificate 3 Level. The National Trade Certificate 3 Level is a one-year programme for Secondary 4 school leavers; 2 years for Secondary 2 and 3 school leavers and 3 years for primary school leavers.

The Board recognizes the importance of the direct participation of industry in industrial training. Accordingly, Trade Advisory Committees have been established to advise on and formulate course curricula and content and to establish national trade test standards. These bodies also advise on the development of facilities and the purchase of training equipment. This is to ensure that the training offered by the Board is relevant to the requirements of industry.

The demand for skilled manpower by industry has been largely met by an increase in emphasis for vocational and technical education and industrial training. Human resource development remains a crucial and integral part of education. Wastage resulting from a failure to match educational output in terms of quantities and types of skills and training to manpower needs is minimised, while the development of highly-skilled workers to meet requirements for skill-intensive industries is given extra impetus.

In 1977, further refinements to the education system were introduced. In primary education, a Basic Course with a modified curriculum to cater for the academically less inclined pupils was started. The modified curriculum is supplemented by training in Workshop Practice for the boys and Domestic Science for the girls. The programme also provides the essential work orientation through the inculcation of correct work attitudes and ethics in the classrooms as well as at work sites.

The Basic Course is linked to a Junior Trainee Scheme under which pupils who have completed the Basic Course are offered the opportunity to learn a job or trade. Training programmes are available in various establishments in the private and public sectors. During the period of gainful employment, junior trainees have to undergo an extension education programme organized by the Adult Education Board, another Statutory Board concerned with adult and continuing education. Where establishments can provide their own training and education programme of an acceptable standard, the junior trainees may attend these instead of the programme offered by the Adult Education Board.

With effect from 1979, secondary school pupils who are not academically inclined will be channelled to vocational stream for training in various trade areas conducted by the Industrial Training Board and Adult Education Board. The emphasis in the vocational stream is to learn a specific trade or vocation. The other pupils will proceed to the academic, technical or commercial stream depending on interest, aptitude and performance.

Post-secondary education takes various forms. Pupils may continue with their education in Pre-University classes in selected secondary schools or Junior Colleges and, on successful completion, proceed to a tertiary education. Technician training is available in technical

colleges for those who may find careers in industry more suited to their temperament. For the vast majority of pupils secondary education is terminal, and after completing it, they seek employment.

B. Reorienting School Programmes to Combine Education and Productive Work Experiences

The school system provides for programmes which combine education with productive work experiences. These programmes are directed specifically at children who are not gainfully employed.

For the in-school population a Basic Course has been introduced as a parallel to the Standard Course at the primary level. The objective of the Basic Course, introduced in 1977, is to offer an opportunity for pupils who are unable to cope with the Standard Course to continue with a schooling and training programme more suited to their capabilities and potentials.

Pupils are transferred to the Basic Course at the minimum age of eleven years after failing three times in the Standard Course. The Standard Course is essentially a six-year programme of primary education. A pupil is allowed to be retained not more than twice in the Standard Course. A pupil who fails a third time is channelled to the Basic Course. The rationale is to provide a six-year primary education to pupils who can complete the course successfully, and a maximum of 9 years of primary education for those who are not academically inclined. The diagram in Figure 1 shows the level at which the transfer of pupils from the Standard Course to the Basic Course can take place.

The Basic Course offers a modified primary school curriculum. Briefly the Basic Course curriculum includes the learning of the First Language, Basic Arithmetic, Moral Education and Civics, Craft and Handwork, Physical and Health Education and Music. At the fourth level, when pupils are being prepared for the world of work, boys are given Workshop Practice for some training in handling simple tools and girls are given instruction in Domestic Science. Inculcation of good work attitudes is emphasized through Work Ethics and Work Safety. Table 3 shows the time allocated for the various subjects in the Basic Course.

Figure 1. Diagram showing transfer from Standard Course to Basic Course

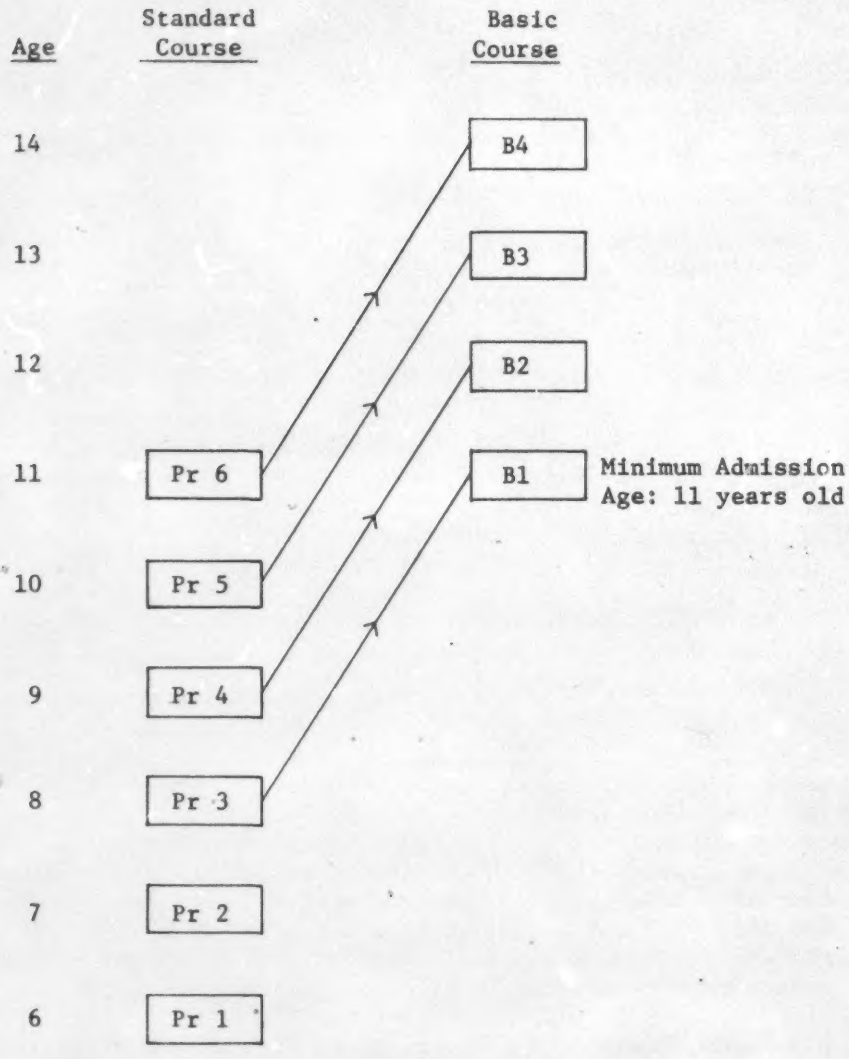

Table 3

The Basic Course Curriculum (Level 1-4)

Subjects	No. of hours per week			
	Level 1	Level 2	Level 3	Level 4
Language	8	8	7	4
Arithmetic	5	5	5	3
Handwork/Handicraft	3	4	5½	-
Civic Training/ Moral Education	1½	1½	1½	-
Workshop Practice/ Domestic Science	-	-	-	12
Work Ethics/ Work Safety	-	-	-	2
Physical Education	1½	1½	1½	1
Music	½	½	½	½
Health Education/ Assembly	½	½	½	½
Spoken 2nd Language	3	3	2½	2
Total (per week)	23	24	24	25

After the Basic Course, pupils are transferred to the Junior Trainee Scheme (JTS) introduced for the first time in January 1977. The Scheme has for its objectives the inculcation of right attitudes to work and the formation of good work habits; the provision of pre-employment training designed to develop the manipulative skills and the ability to use simple hand tools; the placement of trainees in gainful employment and on-the-job training after leaving the school system; and the provision of part-time extension education to trainees for the consolidation and maintenance of literacy and numeracy.

At the extended education centres administered by the Adult Education Board, junior trainees attend classes

on a one-day release basis for six hours in Language, Arithmetic, Civics and Social Education and Spoken Second Language. Attendance at this extended education programme will continue until the junior trainee attains the age of 18, by which time the boys are enlisted for national service and the girls can continue as adult workers.

Pupils in the first two years of secondary education follow a common curriculum. The subjects in the curriculum include the First and Second Languages, Literature, Mathematics, Science, History, Geography, Civics, Art and Crafts, Music, Technical subjects or Home Economics and Physical Education. The time allocated for these subjects is shown in Annex I.

Early orientation in technical education is an essential element in the school system as it is hoped that secondary school pupils, in receiving a more liberal general education can be influenced to consider a wide range of jobs at the end of their school career. The technical component also stresses training in basic manual skills through attendance at Workshop Practice for three hours a week outside normal curriculum time. Workshop Practice is compulsory for boys and 50 per cent of the girls. However, with the adjustments made to the secondary curriculum in 1977, Workshop Practice and Home Economics are taught during school hours and girls may opt for Home Economics instead.

Secondary 3 and 4 pupils offer five compulsory examination subjects and four non-examination subjects. Besides these, they may offer up to a maximum of three electives. The compulsory examination subjects include the First and Second Languages, Mathematics, one Science subject and Literature or History or Geography. The compulsory non-examination components include Civics and Current Affairs, weekly assembly talks, Music and Physical Education. There are more than 20 elective examination subjects in four different groups, i.e. the arts, science, commerce and technical areas. Annex II shows the time allotted for examination, non-examination and elective subjects.

With the implementation of the policy on promotion and retention in the school system from 1978, pupils who are academically less inclined are channelled to the vocational stream to undergo courses provided by the Industrial Training Board and the Adult Education Board.

Arising from the rapid expansion of industry in Singapore, demands by industrial concerns for different categories of workers and professional people are made. Top level management personnel are supported by a broadening base of more junior staff in supervisory grades, skilled and semi-skilled workers, and operatives. These various levels of technical personnel can be described in terms of a pyramid for industrial manpower as shown in Figure 2.

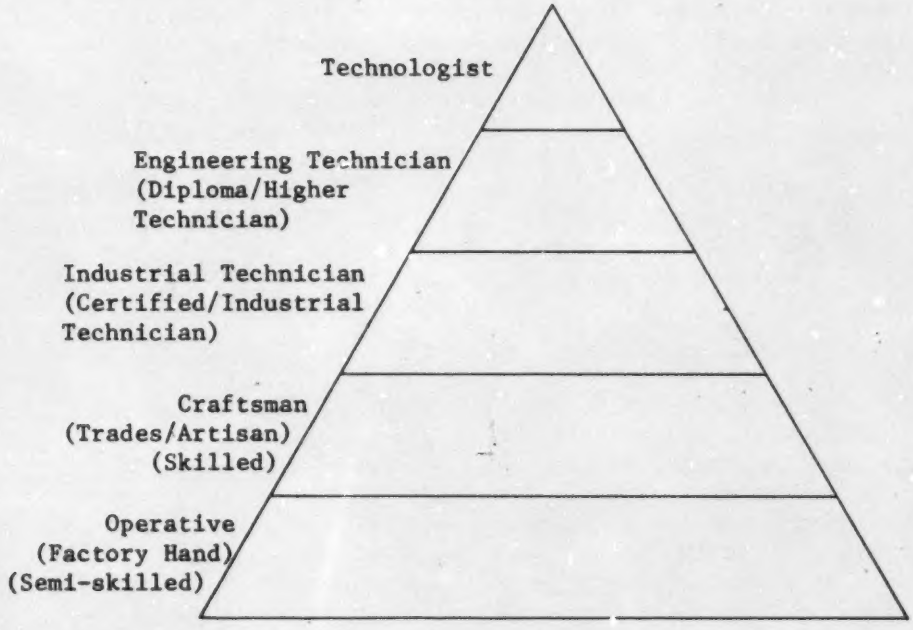

Figure 2. The Industrial Manpower Pyramid

Courses in industrial training conducted by the Industrial Training Board are closely related to this pattern of industrial manpower. Full-time and part-time courses are available at three specific levels of training: technician grade, trade grade and artisan grade.

The general aim of industrial training for technicians is to provide a potential supervisory personnel for industry. Courses are on a two-year full-time basis. These courses include Advertising Art, Automotive Engineering, Fashion Arts, Furniture Design and Production, Industrial Plant Engineering, Interior Design, Letter-press Printing Processes, Offset Lithographic Printing Processes, Three-Dimensional Design, Air-conditioning and Refrigeration, Electrical Engineering, Electronics Engineering, Mechanical Engineering, Drawing and Design. About 16 per cent of the enrolment in the Industrial Training Board follow these technician courses.

Trade Courses form the major component of institutional training in the Industrial Training Board as about 78 per cent of its full-time trainee population are enrolled in these courses. Full-time Trade Courses lead to the National Trade Certificate 3[4]. The 23 courses at Grade 3 available for full-time trainees include

- Accommodation Operations
- Building Draughting
- Compositor's Work
- Dressmaking
- Electrical Fitting and Installation
- Electronics Servicing
- Food and Beverages
- Furniture and Vehicle Upholstery
- Furniture Making
- General Welding
- Heavy Duty Diesel Mechanics
- Letter-press Printing
- Machining Wood-working

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4. The National Trade Certificate Grade 1 (NTC 1) is the level of master craftsman. NTC 2, the intermediate grade, is awarded to those who have reached the standard of fully-trained and competent craftsmen; while NTC 3 is for those who have acquired the basic skills and knowledge of the trade.

- Maintenance Fitting
- Marine Pipe Fitting
- Men's Tailoring
- Metal Fabrication
- Metal Machining
- Motor Vehicle Mechanics
- Offset Lithographic Printing
- Plumbing and Pipe Fitting
- Refrigeration Mechanics
- Ship-building Fabrication

The duration of Trade Courses varies from 1 to 3 years depending on the educational qualification of the students. For pupils who have completed Secondary 4 or Technical 4, the course lasts one year; Secondary 2 and 3 school leavers require a two-year programme. Trade courses provide the trainees with a sound foundation in the chosen trade, enabling them to develop and be upgraded into full craftsmen through further on-the-job training in employment.

Facilities for technical training for industry are also available for artisans in certain trade areas varying from time to time according to demand. Artisan training is provided in specific skills not requiring broader theoretical knowledge. The programmes for artisan training are meant mainly for primary school leavers and their duration ranges from 6 months to a year on a full-time basis. Artisan training is available in

- Bar-bending
- Binding and Finishing
- Building Carpentry
- Cane/Wicker Furniture Making
- General Welding
- Masonry
- Metal Fabrication
- Offset Lithographic Platemaking
- Painting and Decorating
- Panel Beating
- Spray Painting
- Wood-carving

Since 1973, a scheme for productive work has been carried out. The objectives of the scheme are the integration of training and production through course work; the rationalization of the execution of production at the training institutes; the reduction of the cost of training by

recovering, through the sale of products and services, part of the expenses of training. Under the scheme, staff and trainees in ITB vocational institutes engage in various production activities to expose them to the experience of production work under factory conditions. Furniture, vehicle upholstery, general welding, plumbing and pipe-fitting, offset lithographic printing, television servicing, repairs and spray-painting of motor cars are among some of the more popular production work undertaken. In short, realistic practical training is built into the curriculum, wherever possible. In other form, relation of theory to practice is enhanced through an industrial attachment of 6 weeks' duration for Industrial Technician Certificate (ITC) trainees in various industries. The aim of these attachments is to provide exposure to industrial practices, thereby enhancing understanding in the learning of a specific trade.

As industry forms the major consumer of industrial training, their involvement in the planning operations and content of courses conducted by the Industrial Training Board is crucial. In recognition of this important role, Trade Advisory Committees are set up to exploit the expertise and experience of professionals practising in the various trade areas. Important work in vetting test plans and syllabuses is carried out. Planned visits to industrial outfits form another approach to enhance industrial involvement in the training facilities of the Industrial Training Board. Discussions at these visits provide important feedback on the Board's operations and effectiveness.

While industrial training keeps pace with manpower requirements in the industrial sector, full-time day commercial courses are organized by the Adult Education Board to prepare secondary school leavers for employment in the commercial sector. Commercial courses, conducted on a full-time basis, include the

- Accounts Clerks Course
- Advanced Accounts Clerks Course
- Certificate in Accounting Course
- Commercial Practice
- Private Secretary's Course
- School Certificate of Commercial Education

Higher technical training for the industry is mainly provided by the technical colleges through full-time courses of 3 years' duration at technician diploma level. The technician diploma courses, while providing an in-depth study of a specific area of technology, emphasize industrial application. Students spend 40 per cent of their time in practical work in the Workshops and laboratories. In addition to practical work, students undertake work in industry under supervision during vacations. The types of courses at technician level available are:

At the Ngee Ann Technical College

- Building Services
- Electrical and Electronics Engineering
- Mechanical Engineering
- Ship-building and Repair Technology

At the Singapore Polytechnic

- Building
- Chemical Process Technology
- Civil Engineering
- Electrical Engineering
- Electronics and Communication Engineering
- Marine Engineering
- Mechanical Engineering
- Production Engineering
- Ship Construction

Recently, an Industrial Orientation Programme, organized by a Central Agency comprising representatives from the Ministry of Science and Technology, the Science Council, the Chinese Chamber of Commerce, the Singapore Manufacturers' Association, the University of Singapore, Nanyang University, the Singapore Polytechnic, Ngee Ann Technical College and the Industrial Training Board, has enabled full-time students of the four tertiary institutions to visit various industrial establishments to familiarise themselves with the everyday work environment. The Programme has also fostered a closer relationship between the tertiary institutions that produce the manpower and the industrial establishments that use them.

C. Combining Education and Work for Out-of-school Population

Programmes combining education and work for the out-of-school population who are gainfully employed are

many and varied and are provided by statutory bodies, tertiary institutions, community centres and industrial concerns themselves.

Beyond the school system, joint participation between the Singapore Government and large international firms to train young Singaporeans into self-reliant craftsmen to meet the requirements for highly-skilled workers in skill-intensive industries through joint industrial training schemes, is another landmark in education and industrial training. Large international companies requiring a sizeable number of craftsmen are thus encouraged to set up training centres with the Singapore Government on a cost-sharing basis. At present, there are three training centres set up jointly with Tata Precision Industries Pte Ltd, Rollei Singapore Pte Ltd and Philips Singapore Pte Ltd. These training schemes are run by Management Committees drawn up of members comprising Government and the parent company.

In addition to all these government-sponsored and institutional apprenticeship training schemes, there are large factories such as shipyards and transport companies which have their own training schemes to ensure a steady in-flow of new members, related to the specific needs of their organizations, to maintain their existing level and scope of production and to meet expansions envisaged. Modern apprenticeship schemes have been developed by these large organizations. The Keppel Shipyard has developed an elaborate training scheme for its own staff. The training programme, comprising both the off-the-job and on-the-job components, provides training for skilled tradesmen as engineer fitters, turners, welder-burners, pipe workers and carpenters. Those who have completed primary education are eligible for this programme. Skilled craftsman training, leading to nationally recognised trade certificates as machinist-fitter, steel worker, electrician and wood-worker, is provided through the Craft Apprenticeship Scheme and caters for those who have completed 3 years of secondary education. The Technician Traineeship Scheme offers opportunities for further training as Technician Trainee for a period of up to a maximum of three years during which supervisory training is given to teach the trainee the principles of sound supervision and to widen his knowledge of modern management techniques and practices. The 2-year Graduate Training Scheme for qualified engineers,

technicians and administration personnel is aimed at familiarising them with the day-to-day practice in shipbuilding and ship repairing industry.

In August 1976, a 3-year Integrated Apprenticeship Scheme was launched by the Singapore Bus Services Limited, the major bus company in Singapore, in conjunction with the Industrial Training Board. The Scheme provides one year off-the-job institutional training and a two-year on-the-job training. During institutional training, the trainees follow a basic course at National Trade Certificate (Grade 3) level to acquire the foundation for the 2-year on-the-job training. At the end of the apprenticeship, the trainees are expected to attain the National Trade Certificate (Grade 2) level in Commercial Vehicle Mechanics. Secondary 2 school leavers in good health are eligible for this Scheme.

For the first year of training, trainees receive a monthly salary plus free tuition and travel on the company's buses. During the second and third years of on-the-job training, they receive an increase in monthly salary. On completion of training, apprentices continue as employees of the company and receive a monthly salary at skilled-worker rate on a two-year bond.

Industrial training for apprentices does not end with the acquisition of skills, but more importantly, it includes the acquisition of correct work attitudes, work discipline and safety habits. Promising apprentices are also nurtured for wider responsibilities in supervisory grades in later years with the organization. The training programmes of factories are usually administered by their respective personnel departments which assume a training function in consultation with Heads of Departments and training staff. Close liaison with ITB is also maintained.

While regular institutional programmes form the main component of the training activity of the Industrial Training Board, there are numerous other opportunities for workers to upgrade their skills or prepare themselves for public certification through attendance at part-time courses conducted by its various institutes in the evenings.

In addition to these part-time evening courses, the Industrial Training Board also conducts day-release courses for various categories of workers who are sponsored by

industrial establishments. Specially-tailored or ad hoc courses are also conducted on request to meet the changing needs of industrial concerns or to prepare non-technical personnel for new areas of technical functions in these concerns.

Under its Vocational and Technical Education Programme, the Adult Education Board conducts various short ad hoc courses on a part-time basis to suit the educational backgrounds of a diverse student clientele. Part-time courses are organized in the evenings and weekends for the convenience of the public. Among the more popular of these courses are Motor-car Maintenance and Tune-up, Dress-making and Dress Design, City and Guilds Electrical Engineering Practice and Telecommunication, Electrical Drawing and Blueprint Reading, Ladies Permanent Wave Hairdressing, Men's Tailoring and Drafting and Simple Household Wiring.

The Adult Education Board also offers a wide range of part-time commercial education courses during the evenings and weekends for working adults as well as school leavers. These courses cater for students who wish to prepare for careers in the commercial sector and for working adults who wish to upgrade their skills and knowledge to be more proficient in their work or for job advancement. These classes are conducted at centres for the convenience of students residing in various parts of Singapore. The various courses taught include Book-keeping, Commercial English, Shorthand and Typewriting, and Accounting and Costing. Special ad hoc courses of 2-6 months' duration are also conducted in Computer Programming, Import and Export Procedures, Sales and Markets and Chinese Typewriting.

Part-time professional courses in commercial education leading to the Examinations of the Association of Certified Accountants, the Institute of Accounting Staff, the Institute of Business Administration and the Institute of Chartered Secretaries and Administrators, and the Certificate in Banking, are also conducted by the Adult Education Board specially for students who are unable to proceed to overseas colleges offering these courses.

Opportunities for working adults and school leavers to complete their secondary school education are provided for in the evening in the many centres administered by the Adult Education Board. In this way students enhance their job prospects.

Combining education and work

The Singapore Polytechnic offers 5-year part-time day-release courses for personnel employed in industry too. The courses are equivalent to the full-time 3-year diploma courses also offered by the Polytechnic.

The provision of educational facilities for the out-of-school population in vocational and commercial education is not confined to the statutory bodies: other private institutions and civic organizations also play an important role. There are some 43 private commercial schools and nine vocational schools which cater for a wide range of commercial and vocational education in Singapore. Civic organizations and community centres organize vocational courses for adult workers and school leavers in Basic Electronics, Monochrome Television Servicing, Colour Television Servicing, Photography Developing and Printing and Industrial Electricity.

PART II

PROJECT REPORTS

A. Joint Government - Industry Training Scheme

The development of industrial skills is seen as a major requirement in the Republic's effort to encourage industries of high technology and sophistication. Intensive training of young local people, especially in precision metal-machining, tool and die-making, and other related precision trades, is necessary to ensure an available pool of trained workers to attract, and meet the manpower requirements of, the new firms being established.

The Joint Government Industry Training Scheme (JITS) is part of a comprehensive industrial training programme which aims at achieving a realistic training to meet international standards by collaborating with industries which can provide experienced practical instructors and well-tested training programmes. Under this Scheme, the Government provides the capital cost and part of the recurrent cost of the centres, whereas the participating company provides the training expertise, software and the remaining part of the recurrent cost.

At present, three training centres have been established and are administered by the Economic Development Board (Manpower Division). The Centres are:

- Tata-Government Training Centre, established in August, 1972, and located within the premises of Jurong Vocational Institute.
- Rollei-Government Training Centre, established in June, 1973, and located within the premises of Ponggol Vocational Institute.
- Philips-Government Training Centre, established in July, 1973, and located at Jalan Ahmad Ibrahim, Jurong.

The Scheme has for its objective the training of young Singaporeans in precision skills to provide the high-precision industrial sector with a reservoir of productive and specially trained skilled workers through collaboration of expertise of industry and the assistance of Government resources.

The centres are planned and designed according to internationally accepted systems of training and, through the passage of time, will effect the transfer of technical know-how and relevant instructional methods to a corps of local staff, some of whom have undergone training overseas.

Each centre is expected to produce skilled workers in excess of the requirement of the participating company so that the surplus can form a nucleus of highly skilled workers available to other industries.

The Scheme offers a 4-year apprenticeship programme comprising two major parts:

Part I - two years of in-centre training on theory and practice;

Part II - two years of on-the-job training at selected companies.

Part I of the programme provides in-centre (off-the-job) training in theory and practice under the expert guidance of foreign and overseas-trained local instructors while Part II is spent on in-plant (on-the-job) training in selected industries. The training programme requires the trainees to remain in the training centre 44 hours a week. Besides the normal public holidays, the trainees are given an annual leave of 12 working days.

Courses are offered in tool and die-making, precision machining, machine tool building and maintenance, pattern model and mould making, precision optics, precision mechanics, precision opto-mechanics and fine sheet-metal work. The distribution of trainee population by training centre and trade as on September 1977 is shown in Annex III.

An apprentice who has successfully completed the in-centre training is awarded the National Trade Certificate, Grade 2, in the relevant trade.

The training centres recruit apprentices from among Singaporeans between 16-23 years of age. Applicants should have completed Secondary 4 or Technical 4 and/or

relevant trade training at National Trade Certificate, Grade 3, conducted by the Industrial Training Board. Applicants are also required to pass a Government medical examination before acceptance into the Scheme. Candidates with the right qualities for skill training are selected through a series of aptitude tests and an interview. The selection policy has so far been to ensure that students from both technical and academic streams who have the right aptitudes and interest for training are given an opportunity to enrol in this Scheme. However, preference is given to ex-National Servicemen. There is a commitment to increase the intake of reservists.

Upon selection, the apprentices, together with their guardians or sureties, are required to enter into an undertaking with the Government not to discontinue the 4-years' training without reasonable cause acceptable by the training centre, and on successful completion of the in-centre/in-plant training, to serve the Government or any company as may be directed by the Government for a period of three years. The total period of indenture is seven years. In default of any of the above two undertakings, the trainees and guardians or sureties are jointly and severally required to pay liquidated damages.

A training allowance is payable to apprentices during the two years of in-centre training as shown in Table 4.

Table 4

Training Allowance

	Non-Reservist	Reservist		
	Allowance from EDB	Allowance from EDB	Subsidy from ITB*	Total
1st 6 months	S$100	S$100	S$60	S$160
2nd 6 months	S$130	S$130	S$60	S$190
3rd 6 months	S$160	S$160	S$60	S$220
4th 6 months	S$200	S$200	S$60	S$260

* Reservists receive at ITB a subsidy of S$60/- per month in addition to the training allowance.

During the 25th - 48th months inclusive, apprentices are paid a training allowance of between S$260-S$360 per month, and for the period of three years of bonded service, the apprentices are paid a factory pay rate of about S$400 per month according to the grade in which they are employed.

Upon graduation, apprentices are placed in relevant industrial establishments where they are given on-the-job training and employment. At the end of 1977, there were 652 apprentices employed in 74 firms.

The Management Committees of these centres are drawn from both Government and the parent company. Members of the Committee include senior officials from the Economic Development Board, the Ministry of Finance, the Industrial Training Board and top personnel of the joint industrial partners.

To run each training centre, the Government provides local teaching staff and administrative personnel whilst the participating firm provides the technical and managerial expertise including expatriate instructors. All the local instructors at the three centres have received practical training overseas.

B. HDB/PWD/ITB Joint Construction Trades Training Scheme

This Scheme, jointly administered by the Housing and Development Board (HDB), the Public Works Department (PWD) and the Industrial Training Board (ITB) with the participation of HDB Building Contractors, was introduced in January 1974 with the objective of recruiting young Singapore citizens between 14 and 16 years of age for induction into the construction trades to alleviate labour shortages in the construction industry. It assumes that if a young person is thus inducted into a trade early enough and is kept in that trade for a sustained minimum period of two to three years, he is likely to remain in it.

The ITB, through an annual exercise, selects suitable male applicants who must be not younger than 14 years of age, be 1.5 metres tall and weigh not less than 40 kg for the Scheme. Preference is normally given to primary school leavers and students who are attending or have completed the Vocational Preparatory Classes (VPC) conducted by the Adult Education Board. With the phasing out of

the VPC the Scheme is now thrown open to Basic Course pupils and falls into part of the Junior Trainee Scheme.

When the Scheme was first implemented, the period of training lasted two years. In the first year, the trainees attended 1½ days a week of practical and theoretical training at the Ponggol Vocational Institute. They spent four days a week in on-the-job training at work-sites. At the end of the first year, trainees who successfully completed the training were awarded the artisan certificates. For the second year of training, trainees were given full-time on-the-job training at worksites but were released six hours a week from work to attend extended education classes organized by the Adult Education Board. At the end of the second year, trainees were given certificates to mark the completion of their two-year training. During these two years of training, trainees were required to sign a 2-year bond with the sponsoring authority. Liquidated damages for breach of this training agreement was fixed at a sum of S$600/-.

During the period of training, trainees received S$100/- per month for the first year, and S$130/- per month for the second year of training.

However, towards the end of 1977, the training scheme was modified as a result of continuous evaluation and feedback. The training period is now extended to three years or up to the time of call-up for full-time national service, whichever is earlier. A third year has been included to further the consolidation of the skills at the job-sites. The revised scheme provides for one term of full-time block release and the remaining term of one day per week day-release for institutional training at the Ponggol Vocational Institute in the first year of training. The remainin months following the one-term institutional training is spent on on-site training for 4½ days per week.

For the second and third years, trainees attend an extension education programme one day a week at the Adult Education Board centres and continue on-site training for 4½ days a week.

Trainees who successfully complete the first and second years of training will be awarded the artisan certificate and completion certificate respectively. However, the training allowance under the revised scheme has also been modified. During the one-term institutional training trainees receive S$50/- per month and S$100/- per month for

the remaining months during the first year. In the second year, trainees receive S$130/- and for the third year which is, in fact, an employment period, trainees receive a salary of S$200/- per month.

The full cost of training allowance is borne by the HDB, the contractors of HDB and PWD. These allowances are paid in advance to ITB for disbursement to trainees through the Training Managers of Vocational Institutes. Trainees receive their monthly allowances during the first week of the month. ITB provides free tuition and training, including cost of training materials.

Under the revised scheme, a trainee who has his training terminated at any time during the three years will be liable to reimburse in liquidated damages a sum of S$400/- to the sponsoring authority. The substantial reduction in the quantum of liquidated damages is necessary to make the scheme more attractive.

During the period of training, a trainee has a choice of four trades, namely, bar-bending, building carpentry, masonry and painting.

While the labour shortage in the construction industry still persists, yearly intakes of trainees under the Scheme had fallen short of requirements. (See Annex IV). However, for 1977, an appreciable increase was experienced and this trend will be further enhanced by education and continuous guidance to break the initial reluctance on the part of parents to allow their sons to take on jobs in the construction industry because of the high risk of accidents involved. Work in the construction industry also makes tremendous physical demands on the youngsters. But with constant supervision, close monitoring and continuous evaluation, many of the initial problems associated with high accident risks and reluctance to sign the two-year bond have been solved. Stringent legal measures are taken to ensure safety at work-site through the compulsory use of safety-helmets, footwear and safety-belts for work in high-rise buildings.

Many of the young primary school leavers have been turned away because their small physique renders them unsuitable for work in the construction industry. This problem of small build is perhaps related to the kind of nutrition given at home. Research in this area has been initiated.

Annex I

Common Secondary 1 and 2 Curriculum

Subject	Periods per week*
First Language and Literature	8
Second Language	6
National Language	1
Mathematics	5
General Science	6
Physical Education	2
Civics	1
Assembly	1
History and Geography	4
Art and Crafts	2
Music/Singing	1
Metalwork and Woodwork or Home Economics	3**
Total	40

Note: * Each period is of 35-40 minutes' duration.

** Girl pupils offering Home Economics will not take Technical subjects.

Annex II

Secondary 3 and 4 Curriculum

	Subject	Periods per week*
A	Compulsory examination subjects	26
	1 First Language	
	2 Second Language	
	3 Literature or History or Geography	
	4 A Science subject or Home Economics	
	5 Elementary Mathematics	
B	Compulsory non-examination subjects	6
	1 Civics/Current Affairs	
	2 Physical Education	
	3 Assembly Talks	
	4 Musical Appreciation/Singing	
C	Elective examination subjects**	9
	1 Literature	
	2 Geography	
	3 History	
	4 Bible Knowledge or Islamic Religious Knowledge	
	5 Third Language	
	6 Additional Mathematics	
	7 General Science or Physical Science	
	8 Biology or Human and Social Biology	
	9 Art and Crafts	
	10 Music	
	11 Needlework and Dressmaking	
	12 Cookery	
	13 General Housecraft	
	14 Commercial Studies or Commerce	
	15 Principles of Accounts	
	16 Woodwork or Metalwork	
	Total	41

Note: * Each period is of 35-40 minutes' duration

** Special approval is required for three electives. Furthermore, not more than two science subjects are to be taken.

Annex III

Trainee Population by Trade and Centre, September 1977

Trade	In-Centre Enrolment		In-Plant Enrolment		Total
	1st Yr	2nd Yr	3rd Yr	4th Yr	
TATA Government Training Centre					
Tool and Die Making	60	28	-	96	184
Precision Mechanics	37	62	24	-	123
Pattern Model and Mould Making	-	-	57	-	57
ROLLEI Government Training Centre					
Precision Optics	-	22	-	22	44
Precision Mechanics	-	47	24	25	96
Tool and Die Making	129	55	86	49	319
PHILIPS Government Training Centre					
Tool and Die Making	-	-	10	-	10
Precision Metal Machining	100	91	58	-	249
Precision Sheet Metal	-	-	10	-	10
Total	326	305	269	192	1,092

Annex IV

Enrolment in HDB/PWD/ITB Joint Building Construction Trades Training Scheme

Trades	1974		1975		1976		1977	1978*	Total	
	E	C	E	C	E	C	E	E	E	C
Bar-bending	40	20	22	10	71	21	41	20	194	51
Brick Plastering	59	26	-	-	-	-	-	-	59	26
Building Carpentry	-	-	47	23	148	47	117	40	352	70
Construction/ Formwork	47	28	-	-	-	-	-	-	47	28
Construction/ Joinery	59	32	-	-	-	-	-	-	59	32
Electrical Wiring	-	-	-	-	-	-	145	-	145	-
Masonry	-	-	-	-	47	15	174	20	241	15
Painting	21	17	-	-	21	12	58	20	120	29
Plumbing/ Pipe Fitting	-	-	-	-	-	-	16	-	16	-
Total	226	123	69	33	287	95	551	100	1233	251

Note: E - Enrolled
C - Completed

* January intake only.

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